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FORM PTO-1390 (REV 12-29-99) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER: VAL-491-A

U.S. APPLICATION NO. (If known, see 37 CFR 1.5): 09/647906

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/FR99/00788	6 April 1999	6 April 1998

TITLE OF INVENTION: ELECTRIC MOTOR UNIT, IN PARTICULAR FOR MOTOR VEHICLE, INCORPORATING CONTROL ELECTRONICS

APPLICANT(S) FOR DO/EO/US: Christophe Reynard

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. [X] This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. [ ] This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. [X] This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. [ ] A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. [X] A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. [X] is transmitted herewith (required only if not transmitted by the International Bureau).
   b. [ ] has been transmitted by the International Bureau.
   c. [ ] is not required, as the application was filed in the United States Receiving Office (RO/US).
6. [ ] A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. [ ] Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. [ ] are transmitted herewith (required only if not transmitted by the International Bureau).
   b. [ ] have been transmitted by the International Bureau.
   c. [ ] have not been made; however, the time limit for making such amendments has NOT expired.
   d. [ ] have not been made and will not be made.
8. [ ] A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. [X] An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). UNSIGNED COPY
10. [ ] A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. [ ] An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. [ ] An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. [X] A FIRST preliminary amendment.
    [ ] A SECOND or SUBSEQUENT preliminary amendment.
14. [X] A substitute specification.
15. [ ] A change of power of attorney and/or address letter.
16. [X] Other items or information: Red lined Spec.

U.S. APPLICATION NO (if known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO	ATTORNEY'S DOCKET NUMBER
09/647906	PCT/FR99/00788	VAL-491-A

	CALCULATIONS PTO USE ONLY	
17. [X] The following fees are submitted:		
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):		
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO $970.00		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO $840.00		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO $690.00		
International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) $670.00		
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) $96.00		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 840	
Surcharge of **$130.00** for furnishing the oath or declaration later than [X] 20 [ ] 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$ 130	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	- 20 =		X $18.00	$	
Independent claims	- 3 =		X $78.00	$	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ $260.00	$	
TOTAL OF ABOVE CALCULATIONS =				$ 970	
Reduction of 1/2 for filing by small entity, if applicable. A Small Entity Statement must also by filed (Note 37 CFR 1.9, 1.27, 1.28).				$ 0	
SUBTOTAL =				$ 970	
Processing fee of **$130.00** for furnishing the English translation later than [ ] 20 [ ] 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +				$ 0	
TOTAL NATIONAL FEE =				$ 970	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00** per property +				$ 0	
TOTAL FEES ENCLOSED =				$ 970	
				Amount to be: refunded	$
				charged	$

a. [X] A check in the amount of $ 970.00 to cover the above fees is enclosed.

b. [ ] Please charge my Deposit Account No. _____ in the amount of $_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. [X] The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 25-0115. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

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SIGNATURE
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REGISTRATION NUMBER

Our Reference: VAL-491-A

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Christophe Reynard
Serial Number:	Unknown
Filing Date:	Concurrent
Examiner/Art Group Unit:	Unknown/Unknown
Title:	ELECTRIC MOTOR UNIT, IN PARTICULAR FOR MOTOR VEHICLE, INCORPORATING CONTROL ELECTRONICS

PRELIMINARY AMENDMENT

Assistant Commissioner of Patents
Washington, D.C. 20231

Sir:

Entry of this Preliminary Amendment prior to the examination of the above-identified application is respectfully requested.

In the specification:

After the last claim, start and new page and insert --

ABSTRACT

The invention concerns a motor vehicle motor unit comprising a wiper blade carrier plate having a brass insert and a radiator, characterized in that the plate has a plastic over-molding enclosing the insert and the radiator.--.

In the claims:

1. (Amended) [Electric] An electric motor unit of a motor vehicle containing a wiper blade carrier plate[, that presents, first,] having a brass [a] insert and[, second,] a radiator, characterized by the plate presenting a plastic over-molding that surrounds the brass insert and the radiator.

2. (Amended) [Motor] The motor unit according to [specification] claim 1, characterized by the over-molding presenting a partition which, on the plate, separates in a watertight manner, a zone designed to receive [the] an electronic card from [the] a zone designed to receive wiper blade [zone].

3. (Amended) [Motor] The motor unit according to [specification] claim 2, characterized by containing, in addition, a lid designed to close the zone that is delineated

by the peripheral over-molding and the partition and which receives the electronic card, the edge of the over-molding defining a watertight plane for the lid.

4. (Amended) [Motor] The motor unit according to [specification] claim 3, characterized by the separating partition containing the means to allow removal of condensation in the said zone.

5. (Amended) [Motor] The motor unit according to [one of the preceding specifications] claim 1, characterized by the brass insert being directly soldered to the printed circuit card and to the power components.

6. (Amended) [Motor] The motor unit according to [one of the preceding specifications] claim 2, characterized by the over-molding presenting casings designed to receive the electronic card, the components of [this] the electronic card, [and/or] and the components of the plate.

7. (Amended) [Motor] The motor unit according to [one of the preceding specification] claim 1, characterized by the over-molding presenting elastic attachment leads designed to work with complimentary forms [that present] in the case.

8. (Amended) [Motor] The motor unit according to [specification] claim 7, characterized by the elastic leads and the complimentary forms being [started again in such a way as] disposed to limit the relative position of the plate and the case.

9. (Amended) [Motor] The motor unit according to [one of the preceding specifications] claim 1, characterized by the over-molding having the means for the passage of wires designed to power the brass insert.

10. (Amended) [Motor] The motor unit according to [specification] claim 9, characterized by the over-molding containing [the] means [of] for allowing implantation of a connecting module designed to power the brass insert and the electronic [controls] card and allowing the connection towards the exterior by a complimentary connector.

11. (Amended) [Electric motor unit] The motor unit of claim 1 wherein the motor unit is for a motorized fan group used in [the] at least one of a heater [and/or] and a fan [and/or] and an air conditioning unit of a motor vehicle[, characterized by being made up of a motor unit according to one of the preceding specifications].

REMARKS

After entry of this amendment, claims 1 - 11 have been amended.

A hand-written, corrected copy of the specification is enclosed showing the changes which have been made to the specification as required by Section 608.01(Q) and 714.20(1) of the Manual of Patent Examining Procedure. The Substitute Specification filed herewith has been amended to utilize idiomatic English, correct minor typographical and grammatical errors and to conform the application to current United States patent practice. The Substitute Specification includes no new subject matter; but does include the same changes handwritten in red in the attached, corrected, original specification. Entry of the Substitute Specification is respectfully requested.

It is submitted that this Amendment has antecedent basis in the application as originally filed, including the specification, claims and drawings, and that this Amendment does not add any new subject matter to the application. Consideration of the application as amended is requested.

Respectfully submitted,

YOUNG, BASILE, HANLON,
MacFARLANE, WOOD & HELMHOLDT, P.C.

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Dated: September 7, 2000
WMH/dge

SUBSTITUTE SPECIFICATION

Our Reference: VAL-491-A PATENT

ELECTRIC MOTOR UNIT, IN PARTICULAR FOR A MOTOR VEHICLE, INCORPORATING AN ELECTRONICS FOR CONTROL OF THE UNIT

BACKGROUND

This invention involves an electric motor unit and an electronic control of the motor.

The electric motor unit proposed by the invention can be advantageously used in a motorized fan used for the heater and/or vent and/or air conditioner of a motor vehicle.

Historically, the stator of such a motor unit is made up of a carbon carrying plate (PPC) which presents, first, a brass insert and, second, a radiator.

The brass insert serves, first, to guide the electrons and, second, to bring the current closer to the MOSFET transistor lead from the power circuit to the right of the radiator.

The radiator, generally made of aluminum, recools the power components (diodes, MOSFET transistors) and presents casings into which certain electronic components carried by a circuit imprinted with the command electronics are received and held.

A motor unit of this type was described in the French patent application of the Assignee under number 98 03128.

The invention particularly proposes a motor unit structure that allows very high tolerances of connections between the radiator and the brass insert.

The invention also proposes a motor unit structure, the rigidity and the watertightness of which is improved.

The invention also proposes a motor unit structure in which the means of connection and the assembly of the components are simplified.

SUMMARY

The invention proposes an electric motor unit of a motor vehicle containing a wiper blade carrier plate that presents, first, a brass insert and second, a radiator, characterized by the plate presenting a plastic over-molding that surrounds

the insert and the radiator. This over-molding provides make up for play between the pieces.

In addition, the over-molding contributes to the rigidity of the plate, which allows optimization of the design of the radiator and the quantity of aluminum used for it, by removing from the radiator the parts that are not necessary in its recooling and that only serve to increase the rigidity of the plate. Moreover, the over-molding also presents a partition that separates, in a waterproof way, on the plate, the zone designed to receive the electronic card and a wiper blade.

The area that is defined for the over-molding and which receives the card can, in addition, be closed by a lid for which the edge of the over-molding defines a watertight plane.

The combination of the over-molding and the lid is defined by the imprinted circuit card and the electronic components (in the cold area of the motor) a watertight case in which the components thermically isolated in relation to the zone that carries the brushes (electrotechnical zone – hot zone). There is also an uncoupling between the electronic zone and the electrotechnical zone.

It can also, advantageously, be planned that on the separation partition the means of respiration allowing circulation of the air from one zone to the other without allowing the entrance of moisture in the electronic zone.

BRIEF DESCRIPTION OF THE DRAWING

Other characteristics and advantages of the invention will become more clear in the following description. This description is purely illustrative and not limiting. It must be read in regards to the attached drawings In which:

Figure 1 is a cut view schematic representation of the motor unit conforming to one possible method of production of the invention;

Figure 2 is an exploded perspective view of a motor unit from Figure 1;

Figure 3 is a perspective schematic representation illustrating the connection of the plate to the casing of the motor unit of Figures 1 and 2; and

Figure 4 is a detailed perspective representation of the mechanical means for the blockage of the plate in relation to the casing.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The motor unit which is illustrated in Figures 1 and 2 contains a casing 1, a rotational axis 2, an inductor fixed in relation to the casing, and an inductor 4 powered by the brushes 5. These brushes 5 are guided by a brass insert 6 which presents an electronic wiper blade carrier plate (PPCE) that also contains a radiator 7.

On this radiator 7 are placed power components (diodes, MOSFET transistors). A printed circuit card C1, which carries control components, is also placed to the right of this radiator 7.

The PPCE plate presents a over-molding 9 which surrounds the brass insert 6 and the radiator 7. This over-molding 9 also presents a partition 10 that separates, in a watertight manner, on the plate, the zone that is designed to receive an electronic card C1, from the electrotechnical zone that carries the brushes 5. The peripheral over-molding 9 and this partition 10 define, with a lid 12, a watertight case into which is received the electronics card C1.

The peripheral over-molding 9 and the transversal partition 10 together define a watertight plane on which is received a joint 13 that is designed to be compressed between the lid 12 and the edge of the over-molding 9. The lid 12 is made up of a plastic hood 12a in which is placed a metallic-plated hood 12b.

The printed circuit card C1 is double-sided, the components reaching from one side of the card to the other.

It is foreseen that the over-molding 9 casings allow the positioning and holding of the components before soldering the components onto the card.

The power and control current is led to the electronic components (control components of the printed circuit card and power components (MOSFET, diodes) mounted on the radiator 7) by the stripe that presents the brass insert 6. The brass insert 6 is directly soldered to the printed circuit card or to the power components. One removes, as a consequence, a connection level between the printed circuit card C1 and the brass insert 6. The links between the brass insert 6 and the card C1 are thus optimized, which allows the considerable reduction of heating of the surface of the electronic card.

The power components like the MOSFET transistor and the diodes are cooled by the aluminum radiator 7, which is fitted with blades placed in the external air flux.

The radiator 7, the plastic over-molding 9, and the lid are assembled in such a manner to make up a watertight case 1 vis-à-vis the exterior, but also from the interior of the motor (thermal protection, protection from dust, protection from electromagnetic rays, etc.)

The means allowing the removal of condensation produced by the radiator 7 in the case 1 defined by the over-molding 9 and the lid 12 are advantageously foreseen by the watertight partition 10. Also, the over-molding 9 presents the means for the passage of the wires designed to power the brass insert 17. Particularly, the over-molding 9 contains means allowing the implantation of a connecting module designed to power the brass insert 6 and the electronic controls and allows the connection towards the exterior by a complimentary connector.

The electrotechnical part is closed by a flask F.

As one can see in Figures 2 to 4, the over-molding 9 of the plate presents elastic attachment flaps 14 designed to work with complimentary forms 15 can come from the stamping that presents the case 1, in order to stabilize the plate in relation to the case 1.

One will note that one solution for attachment is particularly economical; typically, the means of attaching the plate on the case 1 are made up of rolled-stapled sheet metal.

The elastic leads 14 and the complimentary forms 15 that present the case 1 are, for example, restarted in such a way to create a limitation imposing a single possible position relative between the plate and the case 1. For example, the leads 14 and the forms 15 are angularly spaced, respectively, two by two at 115°, 115°, 130°.

As is illustrated on Figure 4, the elastic leads 14 end, for example, at beveled protuberances 16 that facilitate the connection of the plate onto the case 1 and assure, during of the connection, the mechanical stabilization of the ensemble by

avoiding the lowering of the plate under the counterweight of the electronics incorporated into the motor.

What is Claimed is:

1. Electric motor unit of a motor vehicle containing a wiper blade carrier plate, that presents, first, a brass a insert and, second, a radiator, characterized by the plate presenting a plastic over-molding that surrounds the insert and the radiator.

2. Motor unit according to specification 1, characterized by the over-molding presenting a partition which, on the plate, separates in a watertight manner, a zone designed to receive the electronic card from the wiper blade zone.

3. Motor unit according to specification 2, characterized by containing, in addition, a lid designed to close the zone that is delineated by the peripheral over-molding and the partition and which receives the electronic card, the edge of the over-molding defining a watertight plane for the lid.

4. Motor unit according to specification 3, characterized by the separating partition containing the means to allow removal of condensation in the said zone.

5. Motor unit according to one of the preceding specifications, characterized by the brass insert being directly soldered to the printed circuit card and to the power components.

6. Motor unit according to one of the preceding specifications, characterized by the over-molding presenting casings designed to receive the electronic card, the components of this card, and/or the components of the plate.

7. Motor unit according to one of the preceding specification, characterized by the over-molding presenting elastic attachment leads designed to work with complimentary forms that present the case.

8. Motor unit according to specification 7, characterized by the elastic leads and the complimentary forms being started again in such a way as to limit the relative position of the plate and the case.

9. Motor unit according to one of the preceding specifications, characterized by the over-molding having the means for the passage of wires designed to power the brass insert.

10. Motor unit according to specification 9, characterized by the over-molding containing the means of allowing implantation of a connecting module designed to power the insert and the electronic controls and allowing the connection towards the exterior by a complimentary connector.

11. Electric motor unit for a motorized fan group used in the heater and/or fan and/or air conditioning of a motor vehicle, characterized by being made up of a motor unit according to one of the preceding specifications.

ALL CAPS, CENTERED

Electric motor unit, in particular, for a motor vehicle, incorporating an electronics for control of the unit

BACKGROUND

This invention involves an electric motor unit and an electronics for control of the motor.

The electric motor unit proposed by the invention can be advantageously used in a motorized fan used for the heater and/or vent and/or air conditioner of a motor vehicle.

Historically, the stator of such a motor unit is made up of a carbon carrying plate (PPC) which presents, first, a brass insert and, second, a radiator.

The brass insert serves to, first, guide the carbons and, second, to bring the current closer to the MOSFET transistor lead from the power circuit to the right of the radiator.

The radiator, generally made of aluminum, recools the power components (diodes, MOSFET transistors) and presents casings into which certain electronic components carried by a circuit imprinted with the command electronics are received and held.

A motor unit of this type was described in the French patent application of the plaintiff disposed under the number 98 03128.

A goal of the invention is, particularly, to propose a motor unit structure that allows very high tolerances of connections between the radiator and the brass insert.

Another goal of the invention is to propose a motor unit structure, the rigidity and the watertightness of which is improved.

Still another goal of the invention is to propose a motor unit structure in which the means of connection and the assembly of the components are simplified.

SUMMARY

The invention proposes an electric motor unit of a motor vehicle containing a wiper blade carrier plate that presents, first, a brass insert and second, a radiator, characterized by the plate presenting a plastic over-molding that surrounds the insert and the radiator.

This over-molding allows it to make up for the play between the pieces.

In addition, it contributes to the rigidity of the plate, which allows optimization of the conception of the radiator and the quantity of aluminum used for it, by removing from the radiator the parts that are not necessary in its recooling and that only serve to increase the rigidity of the plate.

Moreover, the over-molding also presents a partition that separates, in a waterproof way, on the plate, the zone designed to receive the electronic card and a wiper blade.

The area that is defined for the over-molding and which receives the card can, in addition, be closed by a lid for which the edge of the over-molding defines a watertight plane.

The combination of the over-molding and the lid is defined by the imprinted circuit card and the electronic components (in the cold area of the motor) a watertight case in which they are thermically isolated in relation to the zone that carries the brushes (electrotechnical zone – hot zone).

There is also an uncoupling between the electronic zone and the electrotechnical zone.

It can also, advantageously, be planned that on the separation partition the means of respiration allowing circulation of the air from one zone to the other without allowing the entrance of moisture in the electronic zone.

BRIEF DESCRIPTION OF THE DRAWING

Other characteristics and advantages of the invention will become more clear in the following description. This description is purely illustrative and not limiting. It must be read in regards to the attached drawings on which:

- figure 1 is a cut view schematic representation of the motor unit conforming to one possible method of production of the invention;
- figure 2 is an exploded perspective view of a motor unit from figure 1;
- figure 3 is a perspective schematic representation illustrating the connection of the plate to the casing of the motor unit of figures 1 and 2; and
- figure 4 is a detailed perspective representation of the mechanical means for the blockage of the plate in relation to the casing.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The motor unit which is illustrated in figures 1 and 2 contains a casing 1, a rotational axis 2, an inductor fixed in relation to the casing, and an inductor 4 powered by the brushes or carbons 5.

These brushes or carbons 5 are guided by a brass insert 6 which presents an electronic wiper blade carrier plate (PPCE) that also contains a radiator 7.

On this radiator 7 are placed power components (diodes, MOSFET transistors).

A printed circuit card C1, which carries control components, is also placed to the right of this radiator 7.

The PPCE plate presents a over-molding 9 which surrounds the brass insert 6 and the radiator 7.

This over-molding 9 also presents a partition 10 that separates, in a watertight manner, on the plate, the zone that is designed to receive an electronic card C1, from the electrotechnical zone that carries the brushes 5.

The peripheral over-molding 9 and this partition 10 define, with a lid 12, a watertight case into which is received the electronic card C1.

The peripheral over-molding and the transversal partition 10 together define a watertight plane on which is received a joint 13 that is designed to be compressed between the lid 12 and the edge of the over-molding 9.

This lid 12 is made up of a plastic hood 12a in which is placed a metallic-plated hood 12b.

This printed circuit card C1 is double-sided, the components reaching from one side of the card to the other.

It is foreseen that the over-molding 9 casings allow the positioning and holding of the components before soldering them onto the card.

The power and control current is led to the electronic components (control components of the printed circuit card and power components (MOSFET, diodes) mounted on the radiator 7) by the stripe that presents the brass insert 6.

The brass insert is directly soldered to the printed circuit card or to the power components. One removes, as a consequence, a connection level between the printed circuit card C1 and the brass insert. The links between the insert and the card C1 are thus optimized, which allows the considerable reduction of heating of the surface of the electronic card.

The power components like the MOSFET transistor and the diodes are cooled by the aluminum radiator 7, which is fitted with blades placed in the external air flux.

The radiator, the plastic over-molding, and the lid are assembled in such a manner to make up a watertight case vis-à-vis the exterior, but also from the interior of the motor (thermal protection, protection from dust, protection from electromagnetic rays, etc.)

The means allowing the removal of condensation produced by the radiator 7 in the case defined by the over-molding 9 and the lid 12 are advantageously foreseen for in the watertight partition 10.

Also, the over-molding 9 presents the means for the passage of the wires designed to power the brass insert (cut) 17. Particularly, the over-molding contains means allowing the implantation of a connecting module designed to power the insert and the electronic controls and allows the connection towards the exterior by a complimentary connector.

The electrotechnical part is closed by a flask F.

As one can see in figures 2 to 4, the over-molding 9 of the plate presents elastic attachment flaps 14 designed to work with complimentary forms 15 can come from the stamping that presents the case 1, in order to stabilize the plate in relation to the case 1.

One will note that one solution for attachment is particularly economical; habitually, the means of attaching the plate on the case are made up of rolled-stapled sheet metal.

The elastic leads 14 and the complimentary forms 15 that present the case are, for example, restarted in such a way to create a limitation imposing a single possible position relative between the plate and the case.

For example, the leads 14 and the forms 15 are angularly spaced, respectively, two by two at 115°, 115°, 130°.

As is illustrated on figure 4, the elastic leads 14 end, for example, by beveled protuberances 16 that facilitate the connection of the plate onto the case and assure, during of the connection, the mechanical stabilization of the ensemble by avoiding the lowering of the plate under the counterweight of the electronics incorporated into the motor.

[Specifications]

What is Claimed is :

1. Electric motor unit of a motor vehicle containing a wiper blade carrier plate, that presents, first, a brass a insert and, second, a radiator, characterized by the plate presenting a plastic over-molding that surrounds the insert and the radiator.

2. Motor unit according to specification 1, characterized by the over-molding presenting a partition which, on the plate, separates in a watertight manner, a zone designed to receive the electronic card from the wiper blade zone.

3. Motor unit according to specification 2, characterized by containing, in addition, a lid designed to close the zone that is delineated by the peripheral over-molding and the partition and which receives the electronic card, the edge of the over-molding defining a watertight plane for the lid.

4. Motor unit according to specification 3, characterized by the separating partition containing the means to allow removal of condensation in the said zone.

5. Motor unit according to one of the preceding specifications, characterized by the brass insert being directly soldered to the printed circuit card and to the power components.

6. Motor unit according to one of the preceding specifications, characterized by the over-molding presenting casings designed to receive the electronic card, the components of this card, and/or the components of the plate.

7. Motor unit according to one of the preceding specification, characterized by the over-molding presenting elastic attachment leads designed to work with complimentary forms that present the case.

8. Motor unit according to specification 7, characterized by the elastic leads and the complimentary forms being started again in such a way as to limit the relative position of the plate and the case.

9. Motor unit according to one of the preceding specifications, characterized by the over-molding having the means for the passage of wires designed to power the brass insert.

10. Motor unit according to specification 9, characterized by the over-molding containing the means of allowing implantation of a connecting module designed to power the insert and the electronic controls and allowing the connection towards the exterior by a complimentary connector.

11. Electric motor unit for a motorized fan group used in the heater and/or fan and/or air conditioning of a motor vehicle, characterized by being made up of a motor unit according to one of the preceding specifications.

3/prt.

ELECTRIC MOTOR UNIT, IN PARTICULAR FOR A MOTOR VEHICLE, INCORPORATING CONTROL ELECTRONICS

This invention involves an electric motor unit and an electronics for control of the motor.

The electric motor unit proposed by the invention can be advantageously used in a motorized fan used for the heater and/or vent and/or air conditioner of a motor vehicle.

Historically, the stator of such a motor unit is made up of a carbon carrying plate (PPC) which presents, first, a brass insert and, second, a radiator.

The brass insert serves to, first, guide the carbons and, second, to bring the current closer to the MOSFET transistor lead from the power circuit to the right of the radiator.

The radiator, generally made of aluminum, recools the power components (diodes, MOSFET transistors) and presents casings into which certain electronic components carried by a circuit imprinted with the command electronics are received and held.

A motor unit of this type was described in the French patent application of the plaintiff disposed under the number 98 03128.

A goal of the invention is, particularly, to propose a motor unit structure that allows very high tolerances of connections between the radiator and the brass insert.

Another goal of the invention is to propose a motor unit structure, the rigidity and the watertightness of which is improved.

Still another goal of the invention is to propose a motor unit structure in which the means of connection and the assembly of the components are simplified.

The invention proposes an electric motor unit of a motor vehicle containing a wiper blade carrier plate that presents, first, a brass insert and second, a radiator, characterized by the plate presenting a plastic over-molding that surrounds the insert and the radiator.

This over-molding allows it to make up for the play between the pieces.

In addition, it contributes to the rigidity of the plate, which allows optimization of the conception of the radiator and the quantity of aluminum used for it, by removing from the radiator the parts that are not necessary in its recooling and that only serve to increase the rigidity of the .

Moreover, the over-molding also presents a partition that separates, in a waterproof way, on the plate, the zone designed to receive the electronic card and a wiper blade.

The area that is defined for the over-molding and which receives the card can, in addition, be closed by a lid for which the edge of the over-molding defines a watertight plane.

The combination of the over-molding and the lid is defined by the imprinted circuit card and the electronic components (in the cold area of the motor) a watertight case in which they are thermically isolated in relation to the zone that carries the brushes (electrotechnical zone – hot zone).

There is also an uncoupling between the electronic zone and the electrotechnical zone.

It can also, advantageously, be planned that on the separation partition the means of respiration allowing circulation of the air from one zone to the other without allowing the entrance of moisture in the electronic zone.

Other characteristics and advantages of the invention will become more clear in the following description. This description is purely illustrative and not limiting. It must be read in regards to the attached drawings on which:

- figure 1 is a cut view schematic representation of the motor unit conforming to one possible method of production of the invention;

- figure 2 is an exploded perspective view of a motor unit from figure 1;

- figure 3 is a perspective schematic representation illustrating the connection of the plate to the casing of the motor unit of figures 1 and 2;

- figure 4 is a detailed perspective representation of the mechanical means for the blockage of the plate in relation to the casing.

The motor unit which is illustrated in figures 1 and 2 contains a casing 1, a rotational axis 2, an inductor fixed in relation to the casing, and an inductor 4 powered by the brushes or carbons 5.

These brushes or carbons 5 are guided by a brass insert 6 which presents an electronic wiper blade carrier plate (PPCE) that also contains a radiator 7.

On this radiator 7 are placed power components (diodes, MOSFET transistors).

A printed circuit card C1, which carries control components, is also placed to the right of this radiator 7.

The PPCE plate presents a over-molding 9 which surrounds the brass insert and the radiator.

This over-molding 9 also presents a partition 10 that separates, in a watertight manner, on the plate, the zone that is designed to receive an electronic card C1, from the electrotechnical zone that carries the brushes.

The peripheral over-molding and this partition 10 define, with a lid 12, a watertight case into which is received the electronic card C1.

The peripheral over-molding and the transversal partition 10 together define a watertight plane on which is received a joint 13 that is designed to be compressed between the lid 12 and the edge of the over-molding 9.

This lid 12 is made up of a plastic hood 12a in which is placed a metallic-plated hood 12b.

This printed circuit card C1 is double-sided, the components reaching from one side of the card to the other.

It is foreseen that the over-molding 9 casings allow the positioning and holding of the components before soldering them onto the card.

The power and control current is led to the electronic components (control components of the printed circuit card and power components (MOSFET, diodes) mounted on the radiator 7) by the stripe that presents the brass insert 6.

The brass insert is directly soldered to the printed circuit card or to the power components. One removes, as a consequence, a connection level between the printed circuit card C1 and the brass insert. The links between the insert and the card C1 are

thus optimized, which allows the considerable reduction of heating of the surface of the electronic card.

The power components like the MOSFET transistor and the diodes are cooled by the aluminum radiator 7, which is fitted with blades placed in the external air flux.

The radiator, the plastic over-molding, and the lid are assembled in such a manner to make up a watertight case vis-à-vis the exterior, but also from the interior of the motor (thermal protection, protection from dust, protection from electromagnetic rays, etc.)

The means allowing the removal of condensation produced by the radiator 7 in the case defined by the over-molding 9 and the lid 12 are advantageously foreseen for in the watertight partition 10.

Also, the over-molding 9 presents the means for the passage of the wires designed to power the brass insert (cut 17). Particularly, the over-molding contains means allowing the implantation of a connecting module designed to power the insert and the electronic controls and allows the connection towards the exterior by a complimentary connector.

The electrotechnical part is closed by a flask F.

As one can see in figures 2 to 4, the over-molding 9 of the plate presents elastic attachment flaps 14 designed to work with complimentary forms 15 can come from the stamping that presents the case 1, in order to stabilize the plate in relation to the case 1.

One will note that one solution for attachment is particularly economical; habitually, the means of attaching the plate on the case are made up of rolled-stapled sheet metal.

The elastic leads 14 and the complimentary forms 15 that present the case are, for example, restarted in such a way to create a limitation imposing a single possible position relative between the plate and the case.

For example, the leads 14 and the forms 15 are angularly spaced respectively two by two at 115°, 115°, 130°.

As is illustrated on figure 4, the elastic leads 14 end, for example, by beveled protuberances 16 that facilitate the connection of the plate onto the case and assure,

during of the connection, the mechanical stabilization of the ensemble by avoiding the lowering of the plate under the counterweight of the electronics incorporated into the motor.

Specifications

1. Electric motor unit of a motor vehicle containing a wiper blade carrier plate, that presents, first, a brass a insert and, second, a radiator, characterized by the plate presenting a plastic over-molding that surrounds the insert and the radiator.

2. Motor unit according to specification 1, characterized by the over-molding presenting a partition which, on the plate, separates in a watertight manner, a zone designed to receive the electronic card from the wiper blade zone.

3. Motor unit according to specification 2, characterized by containing, in addition, a lid designed to close the zone that is delineated by the peripheral over-molding and the partition and which receives the electronic card, the edge of the over-molding defining a watertight plane for the lid.

4. Motor unit according to specification 3, characterized by the separating partition containing the means to allow removal of condensation in the said zone.

5. Motor unit according to one of the preceding specifications, characterized by the brass insert being directly soldered to the printed circuit card and to the power components.

6. Motor unit according to one of the preceding specifications, characterized by the over-molding presenting casings designed to receive the electronic card, the components of this card, and/or the components of the plate.

7. Motor unit according to one of the preceding specification, characterized by the over-molding presenting elastic attachment leads designed to work with complimentary forms that present the case.

8. Motor unit according to specification 7, characterized by the elastic leads and the complimentary forms being started again in such a way as to limit the relative position of the plate and the case.

9. Motor unit according to one of the preceding specifications, characterized by the over-molding having the means for the passage of wires designed to power the brass insert.

10. Motor unit according to specification 9, characterized by the over-molding containing the means of allowing implantation of a connecting module

designed to power the insert and the electronic controls and allowing the connection towards the exterior by a complimentary connector.

11. Electric motor unit for a motorized fan group used in the heater and/or fan and/or air conditioning of a motor vehicle, characterized by being made up of a motor unit according to one of the preceding specifications.

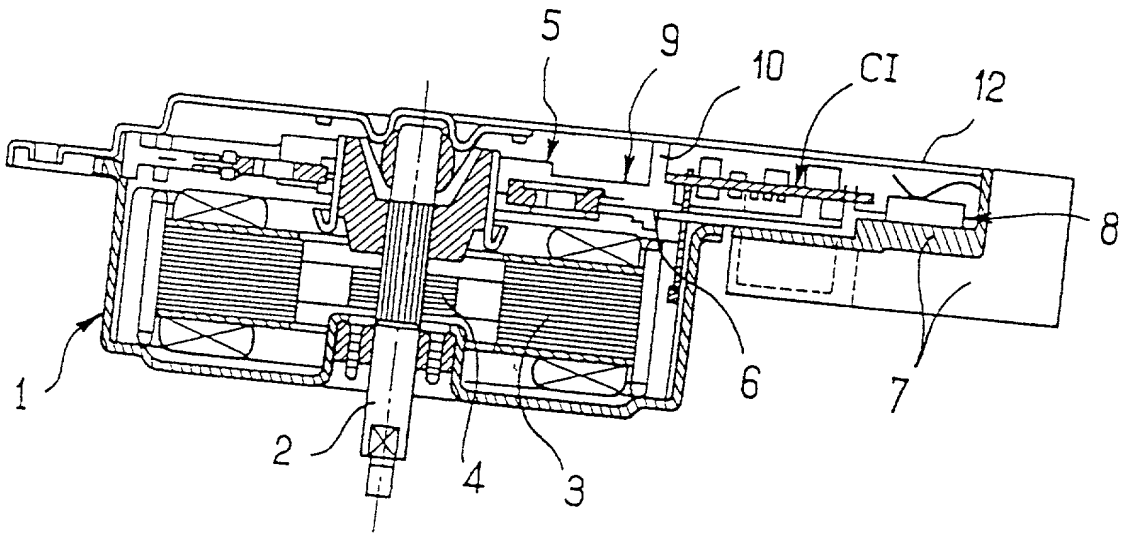

FIG_1

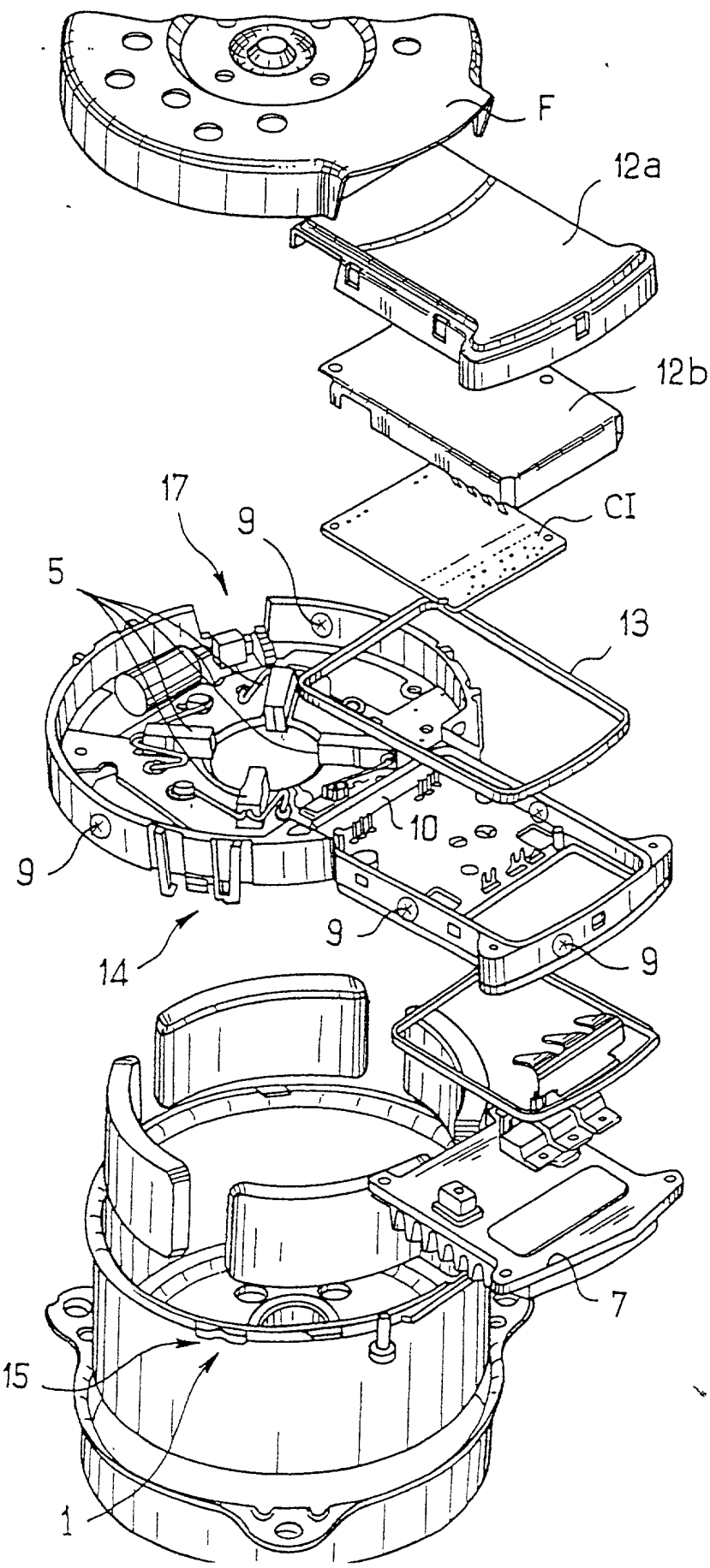

FIG_2

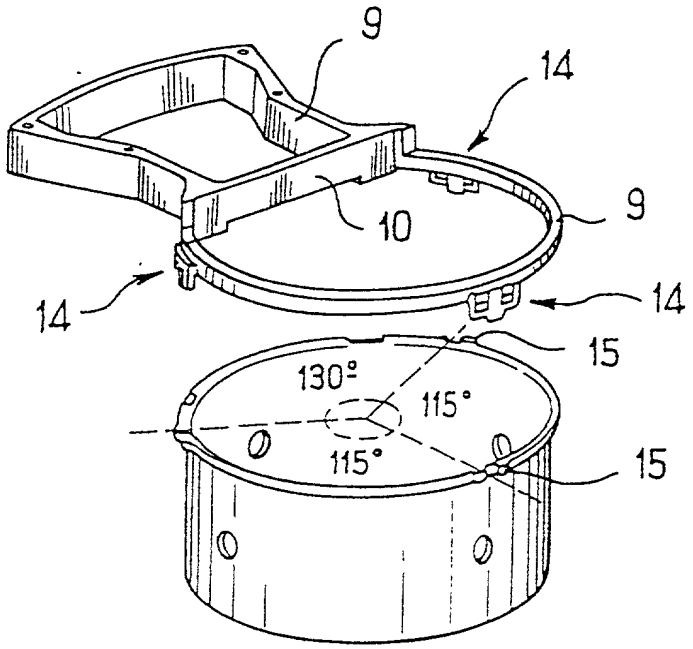

FIG_3

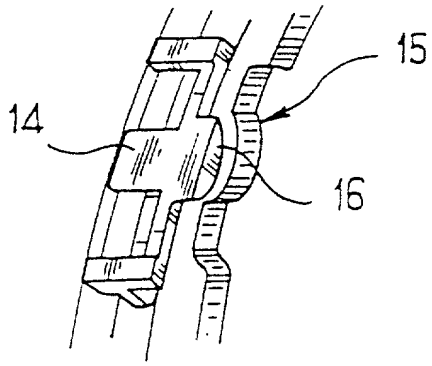

FIG_4

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Declaration and Power of Attorney for Patent Application

Déclaration et Pouvoirs pour Demande de Brevet

French Language Declaration

En tant que l'inventeur nommé ci-après, je déclare par le présent acte que:

As a below named inventor, I hereby declare that:

Mon domicile, mon adresse postale et ma nationalité sont ceux figurant ci-dessous à côté de mon nom.

My residence, post office address and citizenship are as stated next to my name.

Je crois être le premier inventeur original et unique (si un seul nom est mentionné ci-dessous), ou l'un des premiers co-inventeurs originaux (si plusieurs noms sont mentionnés ci-dessous) de l'objet revendiqué, pour lequel une demande de brevet a été déposée concernant l'invention intitulée

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

BLOC DE MOTEUR ELECTRIQUE, NOTAMMENT POUR VEHICULE AUTOMOBILE, INTEGRANT UNE ELECTRONIQUE DE COMMANDE

ELECTRIC MOTOR UNIT, IN PARTICULAR FOR MOTOR VEHICLE, INCORPORATING CONTROL ELECTRONICS

et dont la description est fournie ci-joint à moins que la case suivante n'ait été cochée:

the specification of which is attached hereto unless the following box is checked:

☐ a été déposée le _____
sous le numéro de demande des Etats-Unis ou le numéro de demande international PCT
_____ et modifiée le
_____ (le cas échéant).

☒ was filed on 6 April 1999
as United States Application Number or PCT International Application Number PCT/FR99 00788
and was amended on
_____ (if applicable).

Je déclare par le présent acte avoir passé en revue et compris le contenu de la description ci-dessus, revendications comprises, telles que modifiées par toute modification dont il aura été fait référence ci-dessus.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

Je reconnais devoir divulguer toute information pertinente à la brevetabilité comme défini dans le Titre 37, § 1.56 du Code fédéral des réglementations.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

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Je revendique par le présent acte avoir la priorité étrangère, en vertu du Titre 35, § 119(a)-(d) ou § 365(b) du Code des Etats-Unis, sur toute demande étrangère de brevet ou certificat d'inventeur ou, en vertu du Titre 35 365(a) du même Code, sur toute demande internationale PCT désignant au moins un pays autre que les Etats-Unis et figurant ci-dessous et, en cochant la case, j'ai aussi indiqué ci-dessous toute demande étrangère de brevet tout certificat d'inventeur ou toute demande internationale PCT ayant une date de dépôt précédant celle de la demande à propos de laquelle une priorité est revendiquée.

I hereby claim foreign priority under Title 35, United States Code, § 119(a)-(d) or § 365 (b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below, and have also identified below, by checking the box any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Prior foreign application(s) Demande(s) de brevet antérieure(s) (Number) (Numéro)	(Country) (Pays)	Priority Claimed Droit de priorité revendiqué (Day/Month/Year Filed) (Jour/Mois/Année de dépôt)
98/04256	France	06 April 1998 ☒
		☐

Je revendique par le présent acte tout bénéfice, en vertu du Titre 35, § 119(e) du Code des Etats-Unis, de toute demande de brevet provisoire effectuée aux Etats-Unis et figurant ci-dessous.

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below.

(Application No.) (N° de demande)	(Filing Date) (Date de dépôt)

Je revendique par le présent acte tout bénéfice, en vertu du Titre 35, § 120 du Code des Etats-Unis, de toute demande de brevet effectuée aux Etats-Unis, ou en vertu du Titre 35, § 365(c) du même Code, de toute demande internationale PCT désignant les Etats-Unis et figurant ci-dessous et, dans la mesure où l'objet de chacune des revendications de cette demande de brevet n'est pas divulguédans la demande antérieure américaine ou internationale PCT, en vertu des dispositions du premier paragraphe du Titre 35, § 112 du Code des Etats-Unis, je reconnais devoir divulguer toute information pertinente à la brevetabilité, comme défini dans le Titre 37, § 1.56 du Code fédéral des réglementations, dont j'ai pu disposer entre la date de dépôt de la demande antérieure et la date de dépôt de la demande nationale ou internationale PCT de la présente demande:

I hereby claim the benefit under Title 35, United States Code § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

(Application No.) (N° de demande)	(Filing Date) (Date de dépôt)	(Status) (patented, pending, abandoned) (Statut) (breveté, en cours d'examen, abandonné)

Je déclare par le présent acte que toute déclaration ci-incluse est, à ma connaissance, véridique et que toute déclaration formulée à partir de renseignements ou de suppositions est tenue pour véridique; et de plus, que toutes ces déclarations ont été formulées en sachant que toute fausse déclaration volontaire ou son équivalent est passible d'une amende ou d'une incarcération, ou des deux, en vertu de la Section 1001 du Titre 18 du Code des Etats-Unis, et que de telles déclarations volontairement fausses risquent de compromettre la validité de la demande de brevet ou du brevet délivré à partir de celle-ci.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

French Language Declaration

POUVOIRS: En tant que l'inventeur cité, je désigne par la présente l'(les) avocat(s) et/ou agent(s) suivant(s) pour qu'ils poursuive(nt) la procédure de cette demande de brevet et traite(nt) toute affaire s'y rapportant avec l'Office des brevets et des marques: *(mentionner le nom et le numéro d'enregistrement).*

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: *(list name and registration number)*

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Signature de l'inventeur Date	Inventor's signature Date Le 01/11/00
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Nationalité	Citizenship French
Adresse postale	Post Office Address Same as above
Nom complet du second co-inventeur, le cas échéant	Full name of second joint inventor, if any
Signature du second inventeur Date	Second Inventor's signature Date
Domicile	Residence
Nationalité	Citizenship
Adresse postale	Post Office Address

(Fournir les mêmes renseignements et la signature de tout co-inventeur supplémentaire.)

(Supply similar information and signature for third and subsequent joint inventors.)